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## **Congruency of diabetes care with the Chronic Care Model in different Swiss health care organisations from the patients' perspective: A cross sectional study**

Frei, Anja ; Senn, Oliver ; Huber, Felix ; Vecellio, Marco ; Steurer, Johann ; Woitzek, Katja ;  
Rosemann, Thomas ; Steurer-Stey, Claudia

**Abstract:** **QUESTIONS UNDER STUDY:** Patients with chronic illnesses like diabetes mellitus benefit from care following the concept of the Chronic Care Model. To improve quality and to be responsive to patients' needs reliable data on patients' view of care in different healthcare settings are required. We evaluated the congruency of diabetes care with the Chronic Care Model between managed and non-managed care organisations from a patient's perspective. **METHODS:** We compared type 2 diabetes patients from non-managed care with a managed care organisation in Switzerland. We evaluated differences between these settings with the Patient Assessment of Chronic Illness Care 5A questionnaire (PACIC 5A; scale from 1-5) that combines the PACIC and the 5A-approach of physicians' counselling. **RESULTS:** 374 patients completed the PACIC 5A (326 from non-managed care settings, 48 from managed care). The adjusted average PACIC summary score was 3.18 in the non-managed care compared to 3.49 in the managed care sample ( $p = 0.046$ ). Managed care patients scored significantly higher in the subscales goal setting (2.86 vs 3.29;  $p = 0.015$ ), advice (3.23 vs 3.64;  $p = 0.014$ ), assist (2.98 vs 3.44;  $p = 0.016$ ) and arrange (2.50 vs 2.88;  $p = 0.049$ ). **CONCLUSIONS:** Our data from different health care settings suggest that managed care is recognised by type 2 diabetes patients as care that is more congruent with the Chronic Care Model and offers more intense behavioural counselling and self-management support compared with usual primary care in Switzerland. Future research should evaluate larger, more comparable patient groups.

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# Congruency of diabetes care with the Chronic Care Model in different Swiss health care organisations from the patients' perspective: A cross sectional study

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## Summary

**QUESTIONS UNDER STUDY:** Patients with chronic illnesses like diabetes mellitus benefit from care following the concept of the Chronic Care Model. To improve quality and to be responsive to patients' needs reliable data on patients' view of care in different healthcare settings are required. We evaluated the congruency of diabetes care with the Chronic Care Model between managed and non-managed care organisations from a patient's perspective.

**METHODS:** We compared type 2 diabetes patients from non-managed care with a managed care organisation in Switzerland. We evaluated differences between these settings with the Patient Assessment of Chronic Illness Care 5A questionnaire (PACIC 5A; scale from 1–5) that combines the PACIC and the 5A-approach of physicians' counselling.

**RESULTS:** 374 patients completed the PACIC 5A (326 from non-managed care settings, 48 from managed care). The adjusted average PACIC summary score was 3.18 in the non-managed care compared to 3.49 in the managed care sample ( $p = 0.046$ ). Managed care patients scored significantly higher in the subscales goal setting (2.86 vs 3.29;  $p = 0.015$ ), advice (3.23 vs 3.64;  $p = 0.014$ ), assist (2.98 vs 3.44;  $p = 0.016$ ) and arrange (2.50 vs 2.88;  $p = 0.049$ ).

**CONCLUSIONS:** Our data from different health care settings suggest that managed care is recognised by type 2 diabetes patients as care that is more congruent with the Chronic Care Model and offers more intense behavioural counselling and self-management support compared with

usual primary care in Switzerland. Future research should evaluate larger, more comparable patient groups.

**Key words:** primary health care; general practice; health care organisation; chronic disease; diabetes mellitus; chronic care model; patient centred care

## Introduction

Patients with chronic illnesses like diabetes mellitus benefit from care following the concept of the Chronic Care Model (CCM) [1]. This model is based on six core elements: healthcare organisation, delivery system design, clinical information systems, decision support, community resources and self-management support. Together, these elements are designed to facilitate and produce effective interactions between proactive primary care practice teams and empowered patients with the aim to improve processes and outcomes in chronic illnesses [2].

Few instruments are available to assess to what extent provided care is congruent with the CCM. To enable this, the Assessment of Chronic Illness Care (ACIC) has been developed [3]. This questionnaire is completed by healthcare team members and is particularly useful for helping teams to identify gaps and to improve the care process. The shortcoming of the ACIC is that only the physicians and institutions perspective is assessed and this does not necessarily reflect how patients view the care they receive. To overcome this shortage the Patient Assessment of Chronic Illness Care (PACIC) has been developed to assess congruency of provided health care to the CCM from the patients' point of view. The original PACIC has been subsequently expanded in the PACIC 5A with the additional assessment to what extent physicians' counselling reflects the 5A-approach (assess, advise, agree, assist and arrange) [4, 5].

We recently compared the delivery of care for patients with diabetes between managed care, group and single practices in Switzerland by using the ACIC. The managed care prac-

### List of abbreviations

CCM	Chronic Care Model
ACIC	Assessment of Chronic Illness Care
PACIC	Patient Assessment of Chronic Illness Care
Non-MCO	Non-Managed Care Organisation group
MCO	Managed Care Organisation group
CARAT	Chronic Care for Diabetes Study

tices scored significantly better than the other practices [6]. The aim of this study was to evaluate the patients' perspective on CCM congruent diabetes care and to assess to what extent physicians' counselling reflects the 5A-approach between non-managed care and managed care primary practices.

## Methods

This study was conducted in a cross sectional study design.

### Patient recruitment

Patients from the non-managed care group (non-MCO) participated in the Chronic Care for diabetes study (CARAT) [7, 8]. CARAT challenges the hypothesis that implementing elements of the CCM improves quality of care and outcomes. These elements change the organisation of care via trained practice nurses, who provide information and skills to patients.

#### *Non-managed care group*

A total of 30 primary care practices participated in CARAT, 10 were single practices and 20 were group practices from the German speaking part of Switzerland. Eligible patients were identified through the general practitioners' registry based on lab results and received an invitation letter from the general practitioners with information about the study. Patients were included in consecutive order of attendance in the practice, regardless of the reason for the encounter. The inclusion criteria were adulthood (age >18 years), diagnosis of type 2 diabetes mellitus according to international diagnostic criteria [9] and at least one HbA1c level of  $\geq 7.0\%$  measured within the preceding year. The latter criterion was formulated because the aim of CARAT was to reduce HbA1c values by 0.5% points considering the current recommendations in guidelines (HbA1c = 6.5%) at study onset. Detailed method and design of the CARAT study have been published elsewhere [7].

#### *Managed care group*

Patients for the managed care organisation group (MCO) were recruited in consecutive order between February and May 2011 from the mediX group practice in Zurich. Inclusion criteria were adulthood (age >18 years) and diagnosis of type 2 diabetes mellitus according to international diagnostic criteria [9]. The mediX organisation is one of the first managed care organisations in Switzerland, founded in 1998. Coordination of care and a team based patient centred approach is a focus. Information is shared with patients and by providers, supported by electronic health records and collaboration within a multiprofessional team including a diabetes nurse, a nutritionist and another specialist when needed. In addition an internet-based clinical information and decision support system for diabetes patients exists that can be used during consultations. Health professionals have access to mediX guidelines which fulfill the demand of evidence base and are based on national and international guidelines, but are more comprehensive summarising the key elements of management for primary care. The mediX guidelines are independent from any pharmaceutical sponsoring.

### **Congruence with the Chronic Care Model (CCM) and the 5A counselling approach from the patients' perspective**

Patients' assessment of provided care was quantified with the Patient Assessment of Chronic Illness Care 5A (PACIC 5A) that combines the assessment of care according to the key elements of the CCM (PACIC) with the patients' assessment to what extent physicians' counselling reflects the 5A-approach (assess, advise, agree, assist and arrange) [10, 11]. The "5A" is the recommended approach for behavioural changes according to the US Preventive Services Task Force (USPSTF) [10]. Glasgow et al. first validated the PACIC 5A in a sample of diabetes patients in 30 primary care practices [11]. In the mean time it was validated also for other chronic conditions, and a German version of the PACIC 5A is available [5].

The PACIC 5A captures the time period of the last six months and includes 26 items (the original 20 PACIC items assessing five scale constructs: patient activation, delivery system/practice design, goal setting/tailoring, problem solving/contextual, follow-up/coordination, and six additional items to produce subscales reflecting each of the 5As of behavioural counselling). "Patient activation" assesses to what extent the patient was motivated and supported by the physician to initiate changes. "Delivery system/practice design" assesses if the patient was supported e.g., by booklets and how satisfied the patient was with the organisation of care. "Goal setting/tailoring" assesses to what extent general instructions and suggestions were adapted to the personal situation. "Problem solving/contextual" addresses how the physician dealt with problems, which interfered with achieving predefined goals. Finally, "Follow-up/coordination" addresses how frequently and consistently the whole process was followed-up. The items are scored on a 5-point Likert scale, ranging from 1 (= never) to full accordance (5 = always). The PACIC summary score is the average of items 1–20, the 5A summary score is the average of items 1–4 and 6–26 (the instrument is available online at: <http://improvingchroniccare.org/tools/pacic.htm>).

### **Data collection and data security**

The ethics committee of the Canton of Zurich approved the study and provided a "certificate of unobjectability". After giving informed consent the PACIC 5A questionnaire was handed out to the patients by the physician or the practice nurse with a stamped envelope with the postal address of the study centre. Patients were informed that neither the physicians nor the practice team had any possibility to be informed of their answers. An independent research assistant of the university anonymised the data and entered them directly into SPSS (version 18.0 or higher). All study related data and documents were stored on a protected server of the University of Zurich. Only members of the study team could access the respective files. Intermediate and final reports were stored in the office of the Institute of General Practice at the Zurich University Hospital.

### **Statistical analyses**

Continuous variables are presented as means and standard deviations ( $\pm$ ), categorical data as frequencies and percentages. Mean differences between the MCO and non-MCO

samples were calculated unadjusted using t-tests for independent samples and using analysis of covariance adjusted for HbA1c, sex, age, years of education, living situation and nationality.

## Results

### Patient characteristics

In total, 374 patients of whom 57.8% were male with a mean age of  $67.8 \pm 10.7$  years participated in the study. 326 patients were non-MCO study participants, 48 were recruited from the MCO. Table 1 shows patient characteristics for both groups. Non-MCO study participants were younger and had a higher HbA1c level ( $\geq$  one HbA1c level of  $\geq 7.0\%$  measured in the preceding year was an inclusion criterion). More patients in this group were still working. The percentage of immigrants was higher in the MCO population. Patients from the two samples did not significantly differ in terms of gender, education, living together with a partner or family (table 1).

### PACIC and 5A scores

The adjusted average PACIC summary score was 3.18 (SE = 0.05) in the non-MCO study sample compared to 3.49 (SE = 0.14) in the MCO sample. This difference was statistically significant ( $p = 0.046$ ). MCO patients also scored higher than non-MCO participants in the five PACIC subscales with significance for the subscale goal setting.

For the adjusted average 5A summary score as well as for the 5A subscores, again a trend for higher scores in the MCO sample was detectable. Patients treated in MCO compared to the non-MCO study participants reported statistically significant higher values for the advice, assist and arrange subscales (table 2).

We also compared our MCO sample with the PACIC 5A data originally published by Glasgow et al. (2005) [4] including a sample of 363 diabetes type 2 patients. Patients in Glasgow's study were younger compared to our population ( $64.1 \pm 11.9$  vs  $67.8 \pm 10.7$  years) and more patients were female than patients in our samples (52.8% vs. 42.2%). The patients from our MCO sample scored higher in the PACIC summary score and all subscores except for follow-up/coordination, where they scored equally. The majority of the non-MCO population scores in Swiss single and group practices were comparable to the original scores (table 2).

## Discussion

Our results showed that from the patients' point of view care varies between traditional Swiss primary care practices and a managed care organisation for patients with diabetes type 2. The extent to which type 2 diabetes patients report having received CCM appropriate care and behavioural counselling shows discrepancies between the two settings.

In our analyses the mean PACIC summary score was comparable between the original U.S. primary care study population and the Swiss non-MCO sample, but patients from the Swiss MCO sample scored significantly higher in the PACIC summary score compared to Swiss non-MCO patients. Areas of CCM activities reported less often in the "usual" Swiss primary care setting were goal setting, problem solving and follow-up/coordination. This is in accordance with the original validation study with diabetes patients, where goal setting, problem solving and follow-up support activities were conducted less often than other actions [11]. It is of note that for goal setting and for the three important behavioural counselling elements advice, assist and arrange patients from the MCO reported significantly higher scores. The latter reflecting more intense self-management support in MCO than in the usual Swiss primary care setting and in the original publication reporting on type 2 diabetes patients from 30 primary care practices throughout Colorado [11].

A large cross-sectional study from Germany assessed usual primary care versus a disease management programme (DMP) in type 2 diabetes patients comparable to our study populations. The average overall score on the PACIC for the patients in the DMP versus usual care group was statistically significant higher. Significant differences were also found for all five subscales of the PACIC and for the 5A summary and subscales with the highest mean difference for the assist subscale [12]. These results are similar to ours comparing usual care with managed care; however, with higher average scores for both of our study populations compared to the German study populations.

The validity of the PACIC 5A was studied also in other chronic conditions. Rosemann et al. [5] demonstrated the PACIC 5A to be a reliable instrument in patients with osteoarthritis. Compared to the osteoarthritis patients both patient groups in our study, usual care and managed care type 2 diabetes patients, scored higher for the PACIC summary score and all 5 subscores as well as for the 5A summary score. One reason could be that patients from our survey were older than the patients with osteoarthritis. Former studies on patient satisfaction with care reported that older

**Table 1:** Patient characteristics between the non-managed care and managed care study samples.

	Non-MCO sample (n = 326)	MCO sample (n = 48)
	Mean $\pm$ SD or n (%)	Mean $\pm$ SD or n (%)
Age (years)	67.0 $\pm$ 10.6	73.3 $\pm$ 10.3
Male gender (n, %)	187 (57.4)	29 (60.4)
HbA1c (%)	7.7 $\pm$ 1.3	7.0 $\pm$ 0.6
Nationality Swiss (n, %)	291 (91.8)	38 (79.2)
Living together with partner/family (n, %)	246 (78.3)	29 (65.9)
Still working (n, %)	100 (32.2)	6 (13.6)
Education (years)	11.6 (3.2)	10.6 (2.9)

patients tend to have a more positive assessment of their physicians [13, 14]. However, Glasgow, Wagner, and colleagues [4] who reported first data on the PACIC from integrated HMO and patients with a variety of different illnesses, 16% of whom had diabetes, showed a small influence of demographic variables on the PACIC scores. The only difference occurred in the diabetes group with significantly higher scores compared to other chronic conditions. It can be assumed that in diabetes, the prime example of chronic illness, more sustained emphasis is put on chronic care elements and that patients with diabetes receive more frequent follow-up care and self-management support compared to patients with other chronic diseases, which could account for the score difference between different chronic conditions.

**Clinical implication:** Physicians' counselling and effective self-management support are crucial for successful care in chronic diseases [1, 9, 15–18]. Self-management is even declared as one of the key outcomes in diabetes and other chronic illnesses [15]. Unfortunately in many health care settings self-management support is among the management activities offered least often or with unwarranted variations [19]. A recently published work from Switzerland assessing retrospectively the compliance of GPs and hospital based internists with diabetes treatment guidelines [20] criticised that non-pharmacological activities, such as lifestyle education and modification, were reported in less than half of the patients. Self-management support was not mentioned at all.

Reported reasons for the gap between recommendation of self-management support of diabetes patients and offering/receiving self-management support include the lack of confidence of health professionals in patients self-managing their own condition, dislike of self-management because misinterpretation of doctors as being disempowered, lack of time, and noteworthy in the context of our results, inadequate training in decision support, collaborative goal setting and problem solving [19, 21]. Another important reason associated with variation in performance is the degree to which care is organised and coordinated [22]. In Switzerland worries about quality of care exist with managed care organisations and criticism is raised that a selection of younger and healthier patients is found in MCOs. Our data show that from the perspective of type 2 diabetes patients these worries and criticisms are arbitrary. Our data also reflect some of the CCM areas that once implemented result in improved patient and system outcomes [1, 2] and should be addressed for future quality improvement work and effective care redesign in Swiss primary care. Education and training of health professionals in effective self-management support and organising care to facilitate implementation into daily practice are prime examples for such CCM areas that need to be attempted. Change concepts could include regular discussion of improvement strategies and self-management support to patients within the care team, regular in-house provider education emphasising the patient's central role in managing his or her health and the use of self-management support strategies that include assessment, goal-setting, action planning and problem-solving.

**Table 2:** Results for PACIC summary score, 5A summary score and PACIC subscales per non-managed care and managed care patients in comparison to the original data.

		Glasgow et al. (2005) (n = 336)	Non-MCO sample (n = 326)	MCO sample (n = 48)	p-value
PACIC summary score	Mean (SD) <sup>1)</sup>	3.2 (0.9)	3.18 (0.85)	3.39 (0.68)	0.072
	Mean adj. (SE) <sup>2)</sup>		3.18 (0.05)	3.49 (0.14)	<b>0.046</b>
Patient activation	Mean (SD)	3.6 (1.1)	3.83 (1.13)	3.73 (0.95)	0.519
	Mean adj. (SE)		3.83 (0.07)	3.85 (0.19)	0.913
Delivery system	Mean (SD)	3.5 (0.9)	3.87 (0.82)	3.98 (0.65)	0.319
	Mean adj. (SE)		3.88 (0.05)	4.10 (0.14)	0.123
Goal setting / tailoring	Mean (SD)	3.0 (1.0)	2.86 (0.98)	3.19 (0.82)	<b>0.020</b>
	Mean adj. (SE)		2.86 (0.06)	3.29 (0.16)	<b>0.015</b>
Problem solving	Mean (SD)	3.4 (1.1)	3.26 (1.22)	3.58 (0.88)	<b>0.039</b>
	Mean adj. (SE)		3.28 (0.07)	3.62 (0.20)	0.116
Follow-up / coordination	Mean (SD)	2.9 (1.0)	2.66 (1.05)	2.87 (0.97)	0.229
	Mean adj. (SE)		2.66 (0.06)	2.98 (0.18)	0.094
5A summary score	Mean (SD)	3.2 (1.0)	3.09 (0.88)	3.31 (0.71)	0.099
	Mean adj. (SE)		3.09 (0.05)	3.41 (0.16)	0.055
Assess	Mean (SD)	3.3 (1.0)	3.20 (1.07)	3.36 (0.86)	0.257
	Mean adj. (SE)		3.20 (0.06)	3.45 (0.18)	0.184
Agree	Mean (SD)	3.4 (1.0)	3.68 (0.96)	3.59 (0.91)	0.563
	Mean adj. (SE)		3.68 (0.06)	3.75 (0.16)	0.692
Advise	Mean (SD)	3.3 (1.0)	3.22 (0.91)	3.50 (0.80)	0.062
	Mean adj. (SE)		3.23 (0.05)	3.64 (0.16)	<b>0.014</b>
Assist	Mean (SD)	3.1 (1.0)	2.98 (1.05)	3.42 (0.83)	<b>0.002</b>
	Mean adj. (SE)		2.98 (0.06)	3.44 (0.18)	<b>0.016</b>
Arrange	Mean (SD)	2.7 (1.0)	2.51 (1.05)	2.78 (1.01)	0.108
	Mean adj. (SE)		2.50 (0.06)	2.88 (0.18)	<b>0.049</b>

<sup>1)</sup> Independent sample t-test between non-MCO and MCO sample

<sup>2)</sup> Based on analysis of covariance adjusted for HbA1c, sex, age, years of education, living situation, nationality



*Strength and limitations*

The strength of our study is the objective assessment of the patients' perspective of diabetes care with a validated instrument that assesses congruence of care with the CCM and the 5A behavioural counselling approach in different primary care settings. However, some important limitations with respect to type and size of study populations, comparability of the populations and generalisability of our results exist. Two major limitations have to be considered and discussed in more detail; firstly, the differences in patients' characteristics and secondly the relationship between small sample size and small effect size in the MCO group. An inclusion criterion for the non-MCO group was at least one HbA1c level of 7% or higher in the preceding year. This criterion was not applied to the MCO group. Non-MCO patients had higher HbA1c levels, were younger and included a smaller proportion of immigrants compared to MCO patients. Even the PACIC is not likely to be influenced by patients' cultural background, our analysis was adjusted for these confounders. In addition, patients participating in the CARAT study reflected our sample of "usual" Swiss primary care practices. It is known that patients included in a trial often show better results than patients treated in usual care.

The MCO mediX is one of the first managed care organisations in Switzerland founded in 1998 with focus on gate keeping and coordinated care, on a team based patient centred approach and active quality improvement for people with chronic illnesses. Particularly for the chosen condition diabetes, strategies for coordinated care and an internet-based clinical information and decision aid system exists. It is possible therefore that our results cannot be transferred to patients with diabetes in other managed care organisations. A further limitation is the small sample size of the MCO and that generalisability is limited. The participants in the MCO group were recruited in only one practice compared to 30 practices recruiting participants for the non-MCO group. A small sample is more prone to showing significant effects by chance. However, a small sample size also reduces the power for detecting significant differences between the groups. With a larger MCO sample the differences revealed might therefore have been more striking. In addition, we cannot exclude a selection bias in the recruitment of the MCO sample, since these patients represent only a part of all type 2 diabetes patients treated in the MCO. However, patients from the sample (n = 48) differed only slightly from the population of MCO patients (n = 541) in terms of age (73.3 vs 68 years), gender (32% vs 39.6% women) and mean HbA1c (7.0% vs 7.3%). In summary, our data from different health care settings suggest that managed care is recognised by type 2 diabetes patients as care that is more congruent with the CCM and that offers more intense behavioural counselling and self-management support compared with usual primary care in Switzerland. Future research should evaluate larger, more comparable patient groups.

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**Authors' contribution:** Concept/design: Claudia Steurer-Stey, Anja Frei, Oliver Senn, Thomas Rosemann. Data analysis/interpretation, statistics: Anja Frei, Oliver Senn, Claudia Steurer-Stey, Johann Steurer. Data collection: Felix Huber, Marco Vecellio, Katja Woitzek, Claudia Steurer-Stey, Anja Frei. Drafting article: Claudia Steurer-Stey, Anja Frei. Critical revision of article: all authors.

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